

WHAT IS CLAIMED IS:

1. A method of forming a gate electrode in a semiconductor, comprising:

forming a polysilicon film and a metal silicide film sequentially on a semiconductor substrate;

performing an annealing process to crystallize the metal silicide film; and

forming a gate electrode by performing a single etching process on the metal silicide film and the polysilicon film.

2. The method of forming a gate electrode in a semiconductor according to claim 1, wherein the annealing process is one of an rapid thermal process (RTP) annealing process and a furnace annealing process for crystallizing an amorphous metal silicide film to form a crystalline metal silicide film.

3. The method of forming a gate electrode in a semiconductor according to claim 2, wherein the RTP annealing process is performed at a temperature ranging from about 900°C to about 1000°C for a time period ranging from about 10 to about 30 seconds in an ambient of N<sub>2</sub> or NH<sub>3</sub> gas, and wherein the furnace annealing process is performed at a temperature ranging from about 850°C to about 1000°C for a time period ranging from

about 5 to about 30 minutes in an ambient of  $N_2$  or  $NH_3$  gas.

4. The method of forming a gate electrode in a semiconductor according to claim 1, wherein the metal silicide film is a tungsten silicide film.

5. The method of forming a gate electrode in a semiconductor according to claim 1, wherein the etching process is performed under a process condition for etching the polysilicon film.

6. The method of forming a gate electrode in a semiconductor according to claim 5, wherein the etching process is a dry etching process which is performed in an inductively coupled plasma chamber into which a mixture gas of  $Cl_2$  gas and  $O_2$  gas is introduced.

7. The method of forming a gate electrode in a semiconductor according to claim 1, wherein the etching process is a dry etching process which is performed in an inductively coupled plasma chamber into which a mixture gas of  $Cl_2$  gas and  $O_2$  gas is introduced.

8. The method of forming a gate electrode in a semiconductor according to claim 1, where in the annealing process results in the etch rate of the crystallized metal silicide film being similar to that of the polysilicon film